

1 We claim:

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- 3 1. A Cable Modem Termination System (CMTS), for coupling via separately provided
- 4 cables to a network, such as a Hybrid-Fiber-Coax Network, the CMTS comprising:
- 5 a) a chassis having at least a first and a second card interface, said chassis having
- 6 electrical paths for coupling signals between said first and said second card
- 7 interface, said signals including a plurality of RF signals;
- 8 b) at least one I/O Card, said I/O Card having a connector interface for coupling
- 9 to the network via the cables, said I/O Card having a first chassis interface for
- 10 mating with said first card interface; and
- 11 c) at least one Line Card having CMTS processing functionality, said Line Card
- 12 having a second chassis interface for mating with said second card interface,
- 13 wherein said Line Card may be mated and unmated from the chassis
- 14 independent of the cables coupling the I/O Card to the network.
- 15
- 16 2. The CMTS of claim 1, wherein the chassis includes a midplane to which said first
- 17 and second card interface are mounted.
- 18
- 19 3. The CMTS of claim 2, wherein the first and second card interface are mounted on
- 20 opposite sides of said midplane.
- 21
- 22 4. The CMTS of claim 3, wherein the first and second card interface share common
- 23 parts.
- 24
- 25

- 1 5. The CMTS of claim 1, wherein the second card interface and second chassis interface  
2 are such that in a single action a plurality of RF signals are simultaneously coupled  
3 and uncoupled, during the mating and unmating respectively, of the Line Card with  
4 the chassis.  
5
- 6 6. The CMTS of claim 5, wherein the second card interface and the second chassis  
7 interface use multi-pin connectors having in cross-section and array of conductors,  
8 and wherein each RF signal in the array is surrounded by protective RF grounds.  
9
- 10 7. The CMTS of claim 5, wherein the second card interface is a rectangular multi-  
11 receptacle jack and the second chassis interface is a rectangular multi-pin plug.  
12
- 13 8. The CMTS of claim 7, wherein RF ground pins are used to protectively surround  
14 each RF signal on the rank, file, and diagonals.  
15
- 16 9. The CMTS of claim 8, wherein at least 9 connector pins are associated with the  
17 coupling of each protected RF signal.  
18
- 19 10. The CMTS of claim 8, wherein each connector couples a plurality of protected RF  
20 signals.  
21
- 22 11. The CMTS of claim 10, wherein RF ground pins are shared in common by at least  
23 two of said plurality of protected RF signals.  
24

- 1 12. The CMTS of claim 8, wherein the rectangular multi-pin connectors are compatible  
2 with the compact-PCI (cPCI) standard.  
3
- 4 13. The CMTS of claim 9, wherein the second card interface is a cPCI J5 connector and  
5 the second chassis interface is a cPCI P5 connector.  
6
- 7 14. The CMTS of claim 13, wherein said connectors present a negligible impedance  
8 discontinuity when coupling the protected RF signals in a 75-ohm transmission  
9 system.  
10
- 11 15. The CMTS of claim 1, wherein the Line Card includes a detachable IF-to-RF module.  
12
- 13 16. The CMTS of claim 15, wherein the IF-to-RF module has RF signals coupled with  
14 the Line Card via a plurality of coaxial connectors that are simultaneously mated and  
15 unmated when the IF-to-RF module is attached and detached, respectively.  
16
- 17 17. The CMTS of claim 15, wherein the IF-to-RF module has RF signals coupled with  
18 the Line Card via a plurality of coaxial cables.  
19
- 20 18. The CMTS of claim 1, wherein the Line Card includes a detachable signal processing  
21 module.  
22
- 23 19. The CMTS of claim 18, wherein the detachable signal processing module includes  
24 upstream and downstream digital signal processing functions.  
25

- 1 20. The CMTS of claim 18, wherein the detachable signal processing module includes  
2 analog-to-digital converters and digital-to-analog converters.  
3
- 4 21. The CMTS of claim 1, further including a packet network interface, said packet  
5 network interface being coupled to said Line Card via said I/O Card, said packet  
6 network interface also being coupled the network.  
7
- 8 22. The CMTS of claim 21, wherein the packet network interface is a switch for  
9 selectively coupling a plurality of Line Cards to the network.  
10
- 11 23. The CMTS of claim 22, wherein the switch is a redundant switch.  
12
- 13 24. The CMTS of claim 22, wherein the switch is coupled to the Line Cards via twisted-  
14 pair Ethernet.  
15
- 16 25. The CMTS of claim 22, wherein the switch is coupled to the network via at least one  
17 optical fiber.  
18
- 19 26. The CMTS of claim 22, wherein the switch functionality is partitioned into a first  
20 switch card and a second switch card, each for mounting on the chassis, said first  
21 switch card being cabled to each of the plurality of Line Cards, the second switch  
22 card being coupled to the first switch card via the chassis, and wherein said second  
23 switch card can be coupled to and uncoupled from the first switch card independent  
24 of said cabling between said first switch card and said Line Cards.  
25

1 27. The CMTS of claim 21, further including a chassis control module (CCM) for  
2 monitoring the status of CMTS subsystems and allocating CMTS resources, said  
3 CCM being coupled to a plurality of Line Cards and the network via the packet  
4 network interface.

5  
6 28. The CMTS of claim 27, wherein the CCM is a redundant CCM (RCCM).  
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